

## INDOOR AIR QUALITY

## Wood-Burning Stoves Get Help from HEPA Filters

In many regions wood is seen as a cheap, renewable resource, and burning wood to heat homes is prevalent in rural and urban areas of North America and Europe.<sup>1</sup> A small, preliminary study suggests air purifiers equipped with high-efficiency particle air (HEPA) filters can lower the amount of indoor fine particulate matter (PM<sub>2.5</sub>) and smoke from woodstoves, potentially reducing residents' risk of cardiovascular disease from exposure to these air pollutants.<sup>2</sup> "Our study is the first that I'm aware of that has shown any measurable health benefit from HEPA filtration in wood-burning communities in relatively young, healthy people," says study leader Ryan Allen, an assistant professor of health sciences at Simon Fraser University, Burnaby, British Columbia.

The researchers monitored 45 nonsmoking adults, average age 43 years, living in 25 homes in Smithers, British Columbia, where residential wood burning is common. Air purifiers costing about \$150 were placed in the most active room of the house and the bedroom. The air purifiers ran for 7 days with the HEPA filter inserted and another 7 days without. The order of filter and control conditions was randomly selected for each participant, and participants were unaware of filter status.<sup>2</sup>

Levels of PM<sub>2.5</sub> and levoglucosan, a validated tracer of woodsmoke, were measured inside and outside the homes. At the end of each 7-day period, blood and urine samples were assessed for markers of inflammation and oxidative stress, and microvascular endothelial function was measured by peripheral artery tonometry.<sup>2</sup>

Use of the HEPA filters reduced indoor PM<sub>2.5</sub> concentrations by 60%, and indoor levoglucosan levels fell by 75% on average, compared with nonuse. HEPA filtration was linked to a 9.4% increase

in the reactive hyperemia index (RHI), a marker of endothelial function, and a 32.6% decrease in C-reactive protein, a marker of inflammation.<sup>2</sup> A reduced RHI reflects an impaired blood vessel response to changes in blood flow and is an early indicator of atherosclerosis.<sup>3</sup> These physical changes occurred even though PM<sub>2.5</sub> levels were relatively low to begin with—about 11 µg/m<sup>3</sup> outdoors compared to the U.S. Environmental Protection Agency's annual average standard of 15 µg/m<sup>3</sup>.<sup>4</sup>

Even people who don't use woodstoves themselves may benefit from HEPA filters, Allen says. "Most stoves don't put smoke into your living room directly," he explains; instead, smoke that is vented outdoors leaks back into nearby homes through cracks around doors and windows.<sup>2</sup>

A larger, better-controlled study is needed to confirm these findings, as well as determine any long-term health benefits of filtering indoor air, such as preventing strokes or heart attacks. Still, these initial results are promising in a world where indoor air pollution from solid fuels such as wood is a top global risk factor for disease and premature death.<sup>5</sup> Moreover, says Lars Barregard, a professor of occupational and environmental medicine at the University of Gothenburg, Sweden, "The use of wood for heating may become more common as the cost of other fuels rise or fossil fuels are restricted."

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### REFERENCES

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## The Beat

by Erin E. Dooley

### DOI to Study Chukchi Oil Spill Impact

As part of a court-ordered supplemental review of oil and gas leasing off Alaska's northwest coast, the Department of the Interior will assess potential environmental impacts of a major oil spill in the Chukchi Sea.<sup>1</sup> The court order resulted from a summer 2010 ruling that found the department had not properly analyzed

the environmental impacts of natural gas development related to a 2008 lease sale of 2.8 million acres in the area. A revised draft of the environmental impact statement should be ready by summer 2011 and will be open for 45 days for public comment, with the final review expected by October.

### PBDEs Off Wal-Mart Shelves

Beginning in June 2011 Wal-Mart will implement testing measures to verify compliance with its ban on polybrominated diphenyl ether (PBDE) flame retardants in certain products on its shelves.<sup>2</sup> Wal-Mart's efforts come without any federal regulation on the compounds, which only recently have begun to be regulated at the state level. Sampling during the National Health and Nutrition Examination Survey 2003–2004 revealed PBDEs in the bodies of nearly every participant tested.<sup>3</sup> Although health effects data are still limited for these compounds, their persistence and ubiquity have raised substantial scientific concern.



### EPA Proposes Third Unregulated Contaminant Monitoring Reg

The U.S. EPA recently proposed monitoring for 30 currently unregulated drinking water contaminants, including 28 chemicals and 2 viruses.<sup>4</sup> The monitoring data would provide information about the prevalence of contaminants on the list to support future EPA decision making. Among the chemical

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